Geometry - Support
Packet #2

Mrs. Burrell - kcburrell@dcboe.com
Mr. Logue - wjlogue@dcboe.com
Mrs. Littleton - klittleton@dcboe.com

We hope all is well with you and your family! Mr. Logue has created videos for the provided notes if you have internet access. They will be posted on google classroom. The code for your class is **np3xicu**. Please complete Practice 6.3, Practice 6.4, Review-Probability Test #2 and the 2 quizizz assignments by May 4th 11:00-1:00 and 4:00-6:00. Please email your teacher if you have any questions.

Geometry

Notes 6.3 – How can you can you organize data using two-way tables to find conditional probabilities?

MGSE9-12.S.CP.3: Understand the conditional probability of A given B as $\frac{P(A \cap B)}{P(B)}$.

Conditional Probability: Contains a condition that limits (or restricts) the sample space for an event.

Example: **If** you are going to homecoming (total), then you will have to buy a ticket.

Your total is ONLY the student's going to HOCO.

Written as: $P(A|B)$ → The probability of event A, given event B.

Given

Formula: $P(A|B) = \frac{P(A \text{ and } B)}{P(B)} = \frac{\text{Overlap}}{\text{Total of B}}$

The table shows the results of a class survey, "Do you own a pet?"

	Yes	No	
Female	8	6	14
Male	5	7	
			13

1. P(own a pet | female) $\frac{8}{14} = \frac{4}{7}$ (overlap / total)

2. P(male | do not own a pet) $\frac{7}{13}$ (overlap / total)

The table shows the results of a class survey, "Did you wash the dishes last night?"

	Yes	No	
Female	7	6	
Male	7	8	15
			14

3. P(wash the dishes | male) $\frac{7}{15}$ (overlap / total)

4. P(female | does not wash the dishes) $\frac{6}{14} = \frac{3}{7}$ (overlap / total)

Using the data in the table, find the probability that a sample of not recycled waste was plastic. Write as a decimal & percent.

	Recycled	Non-Recycled	
Paper	34.9	48.9	83.8
Metal	6.5	10.1	
Glass	2.9	9.1	
Plastic	1.1	20.4	
Other	15.3	67.8	
			156.3

5. P(plastic | non-recycled) $\frac{20.4}{156.3} = .1305 \approx 13.1\%$ (overlap / total)

6. P(Recycled | Paper) $\frac{34.9}{83.8} = .4164 \approx 41.6\%$ (overlap / total)

696 high school students were asked to choose their favorite leisure activity.

	Sports	Hiking	Reading	Texting	Shopping	Other	Total
Female	39	48	85	62	71	29	334
Male	67	58	76	54	68	39	362
Total	106	106	161	116	139	68	696

7. P(male) $\frac{362}{696} = \frac{181}{348}$

8. P(shopping) $\frac{557}{696}$

9. P(female ∩ sports) $\frac{39}{696} = \frac{13}{232}$

10. P(hiking | female) $\frac{48}{334} = \frac{24}{167}$ (overlap / total)

11. P(male | reading) $\frac{76}{161}$ (overlap / total)

12. **If** the student was a female, what is the probability that they chose shopping as their favorite leisure activity? $\frac{71}{334}$ (overlap with female / total)

13. Find the probability that a randomly selected student will be a male **given** that sports was their favorite leisure activity. $\frac{67}{106}$ (overlap with sports / total)

14. Find the probability that a randomly selected student chose texting given that they are female. $\frac{62}{334} = \frac{31}{167}$ (overlap with female / total)

15. If the student chose reading as their favorite leisure activity, what is the probability that they are female? $\frac{85}{161}$ (overlap with reading / total)

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16. The senior class is 55% female, and 32% are females who play a competitive sport. Find the probability that a student plays a competitive sport, given that the student is female.

$$\frac{.32}{.55} = .5818 = 58.2\%$$

(overlap with female / total)

17. During registration, 180 students signed up for band, 30 signed up for art, 16 signed up for band and art. Find the probability of the students who signed up for art, given that they signed up for band.

$$\frac{16}{180} = .0888 = 8.9\%$$

(overlap with band / total)

Geometry
Practice 6.3

The frequencies of the marbles in a bag are shown in the table.

	GREEN	BLUE
LARGE	2	4
SMALL	8	12

_____ 1. Find P(Green|Large)

_____ 2. Find P(Small|Blue)

_____ 3. Find P(Blue)

A town planning committee is considering a new system for public transit. Residents of the town were randomly selected to answer two questions: "Do you work less than 5 miles from home?" and "Would you use the new system to get to work, if it were available?" The results are shown in the table.

		Work less than 5 miles from home?	
		YES	NO
Use new system?	YES	24	32
	NO	44	20

_____ 4. If residents work less than 5 miles from home, what is the probability that they would use the new system?

_____ 5. If residents are willing to use the new system, what is the probability that they don't work less than 5 miles from home?

The table shows the results of a poll of randomly selected high school students who were asked if they prefer to hear all school announcements in the morning or afternoon.

	Underclassmen	Upperclassmen
Morning	8	14
Afternoon	18	10

_____ 6. Find P(Morning|Underclassmen)

_____ 7. Find P(Afternoon|Upperclassmen)

_____ 8. Find P(Morning)

The table shows the results of a customer satisfaction survey for a cellular service provider, by location of the customer. In the survey, customers were asked whether they would recommend a plan with the provider to a friend.

	Arlington	Towson	Parkville
Yes	40	35	41
No	18	10	6

_____ 9. Find P(Yes)

_____ 10. Find P (Yes|Arlington)

_____ 11. Find P(Parkville|No)

Robert is the owner of a car dealership. He is assessing the success rates of his top three sales people in order to offer one of them a promotion. Over two months, for each attempted sale, he records whether the sales person made a successful sale or not. The results are shown in the cart below.

	Successful	Unsuccessful
Becky	6	6
Paul	4	5
Darrell	6	9

_____ 12. Find P(Successful|Becky)

_____ 13. Find P(Unsuccessful|Darrell)

_____ 14. Find the probability that a randomly selected person had a successful sale, given that the person was Paul.

Mrs. Keller surveyed 430 men and 200 women about their vehicles. Of those surveyed, 160 men and 85 women said they own a blue vehicle. Write as a <u>fraction</u>, <u>decimal</u> & <u>percent</u>. GIVE 3 ANSWERS!!!!!

15. If a randomly chosen person is a man, what is the probability of that person having a blue car?

	Blue	Not Blue
Men		
Women		

16. P(Women|Not Blue)

17. P(Men ∩ Not Blue)

18. P(Blue)'

Geometry

Notes 6.4 – How do you find the probability of independent and dependent events?

MGSE9-12.S.CP.2: Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities.

Independent Events

- Event A occurring does NOT affect the probability of Event B occurring.
- Uses the word "and" and sometimes will use "replaced".
- $P(A \text{ and } B) = P(A) \cdot P(B)$

Coins, dice, & spinners won't use replaced.

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1. A coin is tossed and a 6-sided die is rolled. Find the probability of landing on the head side of the coin **and** rolling a 3 on the die.

$$\frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12}$$

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2. A card is chosen at random from a deck of 52 cards. It is then replaced and a second card is chosen. What is the probability of choosing a jack and an eight?

$$\frac{4}{52} \cdot \frac{4}{52} = \frac{1}{169}$$

---

3. A jar contains 3 red, 5 green, 2 blue and 6 yellow marbles. A marble is chosen at random from the jar. After replacing it a second marble is chosen. What is the probability of choosing a green and a yellow marble?

$$\frac{5}{16} \cdot \frac{6}{16} = \frac{15}{128}$$

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4. All of the letters that spell MISSISSIPPI are put into a bag. What is the probability of selecting a vowel, and then after replacing the letter, also drawing an S?

$$\frac{4}{11} \cdot \frac{4}{11} = \frac{16}{121}$$

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5. If you roll a die three times, what is the probability of rolling only even numbers?

P(even and even and even)

$$\frac{3}{6} \cdot \frac{3}{6} \cdot \frac{3}{6} = \frac{1}{8}$$

Dependent Events

- Event A occurring AFFECTS the probability of Event B occurring.
- Usually you will see the words "WITHOUT REPLACING." → The total is different on the 2nd fraction.
- $P(A \text{ and } B) = P(A) \cdot P(B \mid A)$

6. A jar contains 3 red, 5 green, 2 blue and 6 yellow marbles. A marble is chosen at random from the jar. A second marble is chosen without replacing the first one. What is the probability of choosing a green and a yellow marble?

$$\frac{5}{16} \cdot \frac{6}{15} = \frac{1}{8}$$

7. An aquarium contains 6 male goldfish and 4 female goldfish. You randomly select a fish from the tank, do not replace it, and then randomly select a second fish. What is the probability that both fish are male? P(male and male)

$$\frac{6}{10} \cdot \frac{5}{9} = \frac{1}{3}$$

8. Two letters are chosen without replacement at random from the alphabet. If y is considered to be a consonant, find the probability of choosing a vowel and a consonant.

$$\frac{5}{26} \cdot \frac{21}{26} = \frac{21}{130}$$

9. Morgan has 4 blue shirts, 5 purple shirts, and 3 pink shirts in her suitcase. If she selects 2 shirts one after the other without replacement, then what is the probability that both are purple in color? P(purple and purple)

$$\frac{5}{12} \cdot \frac{4}{11} = \frac{5}{33}$$

A bag contains 20 checkers – 10 red and 10 black. Determine whether the events are independent or dependent. Find the indicated probability.

P(black and black)

10. selecting 2 black checkers when they are chosen at random with replacement → Independent

$$\frac{10}{20} \cdot \frac{10}{20} = \frac{1}{4}$$

11. selecting 2 black checkers when they are chosen at random without replacement → Dependent

$$\frac{10}{20} \cdot \frac{9}{19} = \frac{9}{38}$$

Geometry
Practice 6.4

1. A bag contains 5 red, 3 green, 4 blue, and 8 yellow marbles. Find the probability of randomly selecting a green marble, and then a yellow marble if the first marble is replaced.

2. A sock drawer contains 5 pairs of each color socks: white, green and blue. What is the probability of randomly selecting a pair of blue socks, replacing it, and then randomly selecting a pair of white socks?

3. In a standard deck of cards, what is the probability of picking a diamond and then another diamond without replacement?

4. Randy has 4 pennies, 2 nickles, and 3 dimes in his pocket. If he randomly chooses 2 coins, what is the probability that they are both dimes if he doesn't replace the first one?

5. Two students are chosen at random from a class of 30. What is the probability that both you and your friend are chosen?

6. A bag contains number slips numbered 1 to 9. Find the probability of selecting 2 even numbers when 2 slips are chose with replacement.

7. Using the letters in the state ARKANSAS. Find the probability of picking an **S** and then an **A** without replacement.

8. Using the letters in the state ARKANSAS. Find the probability of picking a **K** and then a **N** without replacement.

9. Using the letters in the state ARKANSAS. Find the probability of picking a **R** and then a **S** without replacement.

10. In a standard deck of cards, what is the probability of picking a face card and then another face card without replacement?

11. Find the probability of rolling a number greater than 2 and then rolling a multiple of 3 when a number cube is rolled twice.

12. Maggie has a bag containing 2 yellow plums, 2 red plums, and 3 purple plums. What is the probability that she reaches in without looking and pulls out a yellow plum and eats it, then reaches in again without looking and pulls out a red plum?

13. Drake spins a spinner which is evenly divided into 11 sections numbered 1 - 11. On the first spin, Drake's pointer lands on "8". What is the probability of that the spinner lands on an even number the second time he spins the spinner?

Mixed Review

14. Bianca uses an angle-measuring device on a 3-foot tripod to find the height, h, of a weather\ balloon above ground level, as shown in this diagram. The balloon is at a 40° angle of elevation. A radio signal from the balloon tells Bianca that the distance between the tripod and the balloon is 25,000 ft. Which expression represents the height, h, of the balloon above ground level?

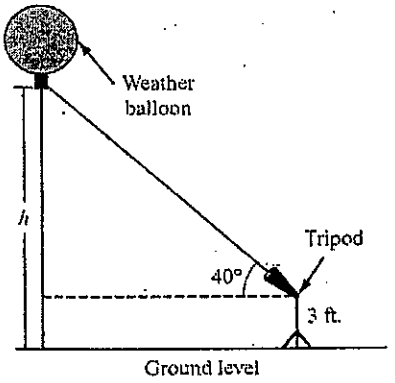
Label the triangle & show your work!!!

a) $25{,}000 \bullet \sin 40° - 3$

b) $25{,}000 \bullet \sin 40° + 3$

c) $\dfrac{25{,}000}{\sin 40°} - 3$

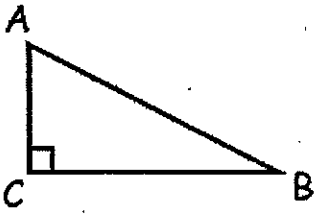
d) $\dfrac{25{,}000}{\sin 40°} + 3$



not drawn to scale

15. In right $\triangle ABC$, the value of cos A is $\dfrac{5}{13}$. What is the value of sin B?

a) $\dfrac{5}{13}$ b) $\dfrac{12}{13}$ c) $\dfrac{13}{12}$ d) $\dfrac{13}{5}$



Geometry
Review – Probability Test #2

The frequencies of the marbles in a bag are shown in the table.

1. Find P(Small | Blue)

2. Find P(Red | Large)

	RED	BLUE
LARGE	2	4
SMALL	8	12

3. If a blue marble was chosen, what is the probability that it would be large?

The table shows the results of a poll of randomly selected high school students who were asked if they prefer to have a pep rally in the morning or afternoon.

4. Find P(Morning | Underclassmen)

5. FindP(Afternoon | Upperclassmen)

	Underclassmen	Upperclassmen
Morning	8	14
Afternoon	18	10

6. What is the probability that a student preferred a morning pep rally, given that they were upperclassmen?

Given the following table of grades from Mrs. Johnson's Geometry classes, find the probabilities (give all answers as a percent).

Males	20	8	10	4
Females	16	14	14	6

7. P("F" | Female)

8. P(Male | "A")

9. What is the probability that if a student was female that they got a passing grade?

10. What is the probability of a male student given that they failed?

11. What is the probability of a female student given that they got a "B"?

12. 85% of your friends like chocolate ice cream, 18% like strawberry ice cream, and 36% Like chocolate and strawberry ice cream. If your friend likes chocolate ice cream, what is the probability that they also like strawberry?

13. 58% of your friends like mountain dew, 35% like sprite, and 22% like mountain dew and sprite. If one of your friends likes sprite, what is the probability that they will like mountain dew? Write your answer as a percent.

---

14. A card is chosen at random from a deck of 52 cards. It is then replaced and a second card is chosen. What is the probability of choosing a black card and then an ace?

15. A sock drawer contains 8 white, 4 black, and 2 blue. What is the probability of randomly selecting a pair of blue socks, replacing it, and then randomly selecting a pair of white socks?

16. Using the letters in the saying **GO BEARCATS**, find the probability of picking an **A** and then a **G** without replacement.

17. Trey has a bag containing 2 green apples, 4 red apples, and 3 yellow apples. What is the probability that he reaches in without looking and pulls out a red apple and eats it, then reaches in again and pulls out another red apple?

Supp.

QUIZIZZ

NAME : _____

CLASS : _____

DATE : _____

Probability Multiplication Rule

18 Questions

1. A jar contains 4 white chips, 5 purple chips, and 1 black chip. Chips are selected randomly one at a time, and are not replaced.
What is P(purple then black)?

☐ a) 1/18 ☐ b) 2/5

☐ c) 3/7 ☐ d) 4/9

2. Jim picks a diamond out of a deck of cards, replaces it and gets a diamond again. What is the probability this happened. (There are 13 diamonds, and 52 cards in a deck)

☐ a) 1/16 ☐ b) 2/13

☐ c) 4/17 ☐ d) 1/21

3. A box contains 5 purple marbles, 3 green marbles and 2 orange marbles. Draws are made without replacement.P(both marbles are purple)

☐ a) 2/9 ☐ b) 1/3

☐ c) 1/2 ☐ d) 1/4

4. A jar contains 4 white chips, 5 purple chips, and 1 black chip. Chips are selected randomly one at a time, and are not replaced.
P(white, then purple, then black)

☐ a) 1/36 ☐ b) 2/39

☐ c) 5/41 ☐ d) 6/43

5. Clara picks a marble at random, puts it back, and then picks another marble at random.

☐ a) Dependent ☐ b) Independent

6. Pablo chooses a colored marble from a mixed bag and writes down the color. Pablo leaves it out and then draws another.

☐ a) Independent ☐ b) Dependent

7. Victor picks a card at random. Without putting the first card back, he picks a second card at random.

☐ a) Dependent ☐ b) Independent

8. How do you write 0.02 as a percent?

☐ a) 20% ☐ b) 200%

☐ c) 2% ☐ d) .02%

9. The outcome of one event does not influence the outcome of the other event

☐ a) independent event ☐ b) tree diagram

☐ c) simple event ☐ d) odds

10. The outcome of one event does influence the outcome of the other event

☐ a) mutually exclusive event ☐ b) probability

☐ c) dependent event ☐ d) simple probability

11. Yasmine places 4 blue beads and seven red beads in bag. What is the probability she picks a blue bead, puts it to the side and selects another blue bead?

- ☐ a) 16/121
- ☐ b) 6/55
- ☐ c) 12/121
- ☐ d) 1/5

12. A bag contains 5 red marbles and 4 pink marbles. A marble is randomly drawn and then replaced. What is the probability the first marble is pink and the second is red?

- ☐ a) 26.9%
- ☐ b) 24.7%
- ☐ c) 20.0%
- ☐ d) 5%

13. Find the probability:
A basket contains 5 apples and 7 peaches. You randomly selct one piece of fruit and eat it. Then you randomly select another piece of fruit. The first piece of fruit is an apple and the second piece is a peach.

- ☐ a) 12/132
- ☐ b) 35/144
- ☐ c) 35/132

14. There are 6 red marbles, 5 green marbles, and 4 yellow marbles in a bag. If Joe picks 2 marbles one after the other without replacement, then what is the probability that both are red in color?

- ☐ a) 2/5
- ☐ b) 1/21
- ☐ c) 4/25
- ☐ d) 1/7

15. There are 2 violet balls and 4 pink balls in a bag. If two balls are drawn one after the other, then what is the probability of getting violet first and pink next, if the first ball drawn is replaced?

- ☐ a) 1/3
- ☐ b) 2/9
- ☐ c) 1/6
- ☐ d) 1/4

16. A farm has 5 brown cows and 10 white cows. A fence is open and two cows escape. What is the probability that it will be a brown cow, then a white cow?

- ☐ a) 1/9
- ☐ b) 2/9
- ☐ c) 5/21
- ☐ d) 10/21

17. In a drawer, there are 6 white socks, 4 black socks, and 2 brown socks. You pick out a sock, replace it, then pick out a 2nd sock. What is the probability that you will pick a brown, then black sock?

- ☐ a) 1/11
- ☐ b) 1/18
- ☐ c) 1/36
- ☐ d) 2/33

18. Probability can be written as ...

- ☐ a) a fraction
- ☐ b) a decimal
- ☐ c) a percent
- ☐ d) all of the above

Supp

QUIZIZZ

NAME : _____

CLASS : _____

DATE : _____

conditional probability

12 Questions

1.

Middle School Music and Sports Survey

	Plays Team Sport	Does Not Play Team Sport	Total
Plays Instrument	8	3	11
Does Not Play Instrument	2	7	9
Total	10	10	20

What is the probability that a student does play a sport given they do not play an instrument?

- ☐ a) .2
- ☐ b) .2222
- ☐ c) .10
- ☐ d) .5

2.

	10	2	8	20
	15	12	3	30
	25	14	11	50

What is the probability that the person picked will be a boy given they speak german?

- ☐ a) .7273
- ☐ b) .4
- ☐ c) .16
- ☐ d) .22

3.

Middle School Music and Sports Survey

	Plays Team Sport	Does Not Play Team Sport	Total
Plays Instrument	8	3	11
Does Not Play Instrument	2	7	9
Total	10	10	20

What is the probability that a student does not play on a sports team?

- ☐ a) .5
- ☐ b) .45
- ☐ c) .55

4.

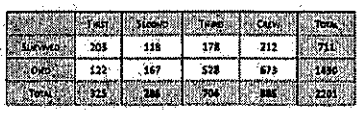
	10	2	8	20
	15	12	3	30
	25	14	11	50

What is the probability that they speak French given they are a girl?

- ☐ a) 2.14
- ☐ b) .24
- ☐ c) .4
- ☐ d) .8571

5. Core Lesson

What is the probability of a passenger on the Titanic surviving given they were in first class?



LEARNZILLA

- [ ] a) .2855
- [ ] b) .6246
- [ ] c) .0922
- [ ] d) .3230

6.

Hair colour	Boys	Girls
Black		
Blonde	4	6
Brown		
Red	2	1

What percentage of the students were boys?

- [ ] a) 20%
- [ ] b) 25%
- [ ] c) 40%
- [ ] d) 50%

7.

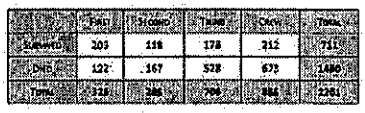
	13	3
	5	4

What percentage of students do chores?

- [ ] a) 64%
- [ ] b) 81%
- [ ] c) 36%
- [ ] d) 31%

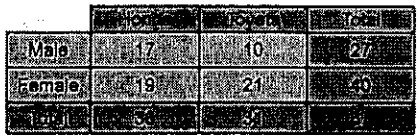
8. Core Lesson

What is the probability of a passenger on the Titanic surviving given they were in first class?



LEARNZILLA

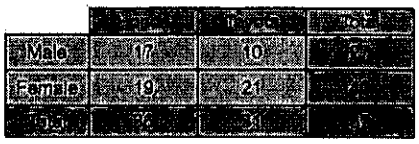
- [ ] a) .2855
- [ ] b) .6246
- [ ] c) .0922
- [ ] d) .3230

9. 

	Honda	Toyota	Total
Male	17	10	27
Female	19	21	40
Total	36	31	

What is the probability of choosing a Honda?

- ☐ a) .5970
- ☐ b) .5373
- ☐ c) .4627
- ☐ d) .4030

10. 

Male	17	10	
Female	19	21	
Total	36	31	

What is the probability that a female is chose given they like a Toyota?

- ☐ a) .525
- ☐ b) .4627
- ☐ c) .6774
- ☐ d) .3143

11.

	Burrito	Pizza	Total
Freshman	7	3	10
Sophomore	6	5	11
Junior	12	2	14
Senior	5	10	15
Total	30	20	50

P(Pizza | Senior):

- ☐ a) 10/15
- ☐ b) 4/5
- ☐ c) 2/3
- ☐ d) 10/5

12. Core Lesson

What is the probability of a passenger on the Titanic surviving given they were in first class?

	First	Second	Third	Crew	Total
Survived	203	118	178	212	711
Died	122	167	528	673	1490
Total	325	285	706	885	2201

LEARNZILLA

What is the probability of a passenger on the Titanic surviving given they were in first class?

- ☐ a) .2855
- ☐ b) .6246
- ☐ c) .0922
- ☐ d) .3230